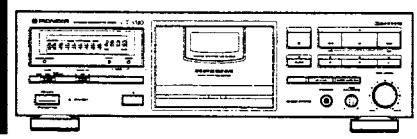
PIONEER®
The Art of Entertainment

Service Manual



ORDER NO.
ARP2751

STEREO CASSETTE DECK

CT-S320

CT-S320 HAS THE FOLLOWING:

Type	Power Requirement	Remarks
HEM	AC220 – 230V, 230 – 240V (switchable) *	
HB	AC220 – 230V, 230 – 240V (switchable) *	
HPW	AC220 – 230V, 230 – 240V (switchable) *	
SD	AC110V, 120 – 127V, 220V, 240V (switchable)	
SL	AC110V, 120 – 127V, 220V, 240V (switchable)	

* Change the connection of the power transformer's primary wiring.

- **This manual is applicable to CT-S320/HEM, HB, HPW, SD and SL.**
- **For HB, HPW, SD and SL types, refer to page 27.**

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1. EXPLODED VIEWS, PACKING AND PARTS LIST

1.1 EXTERIOR AND PACKING

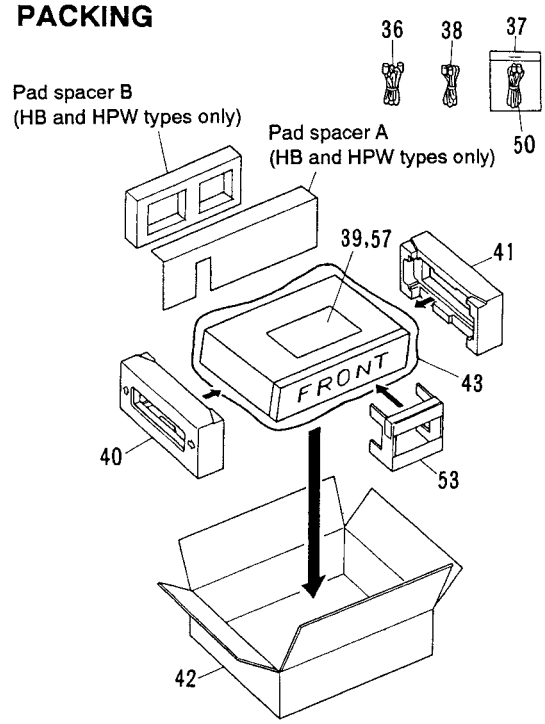
NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

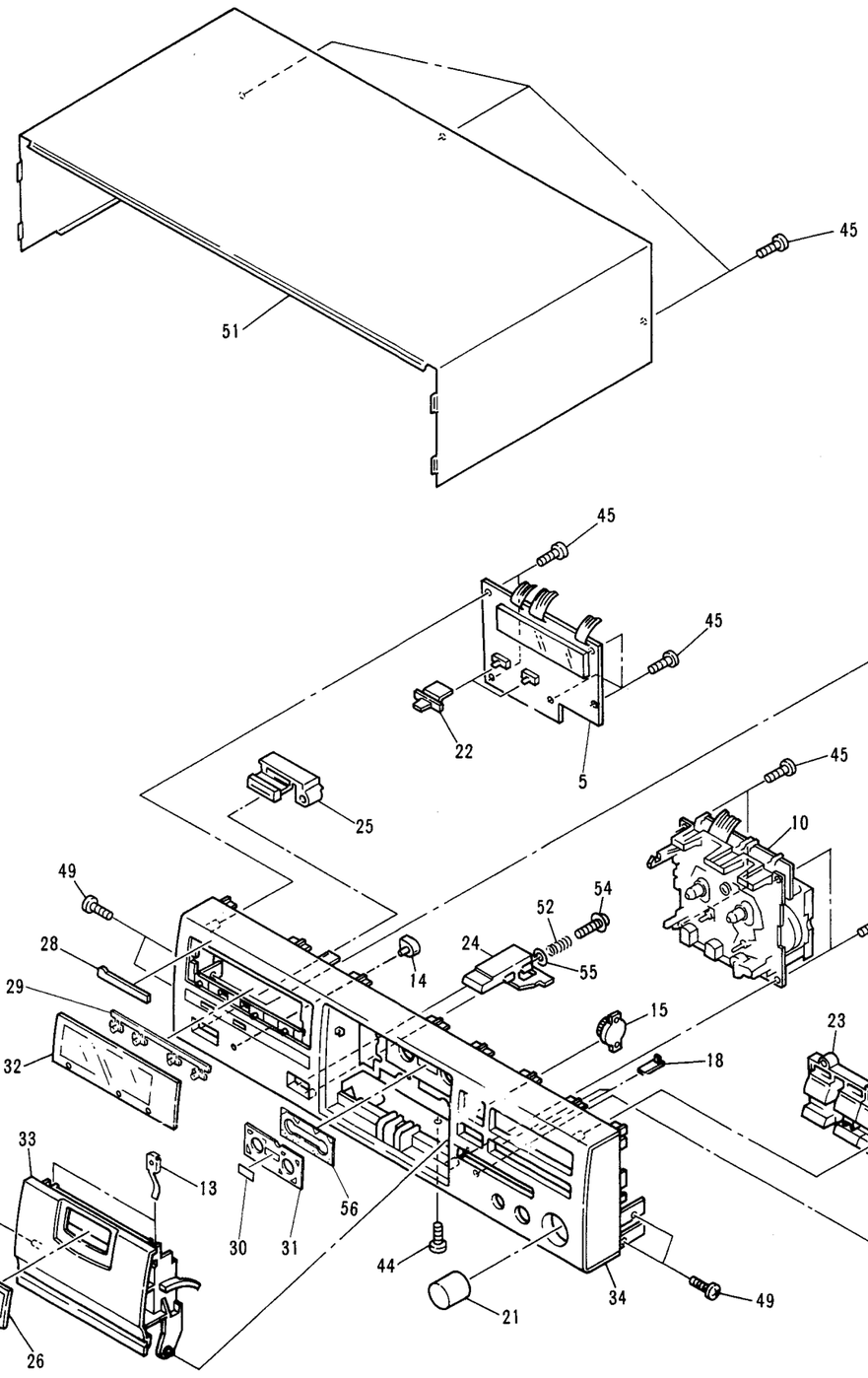
Parts List

Mark	No.	Description	Part No.
	1	Main unit	RWZ2872
NSP	2	HX unit	RWX1034
	3	1/f unit	RWX1087
	4	Operate unit	RWZ2873
	5	FL unit	RWZ2874
⚠	6	Strain relief	CM – 22B
⚠	7	Fuse FU1001, 1002 (T1.25A)	REK1023
⚠	8	Power transformer	RTT1229
⚠	9	AC power cord	RDG1026
⊙	10	Mechanism unit	RYM1205
NSP	11	PCB spacer	PNY – 404
	12	Door spring L	RBH1341
	13	Half pressure spring	RBK1004
	14	LED lens	PNW2019
	15	Damper assembly	REC1005
NSP	16	Main chassis	RNB1090
	17	Cord clamper	RNH – 184
	18	Indicator lens S	PNW1893
	19	Insulator	PNW1912
	20	Balance knob	RAC1705
	21	VR knob	RAC1707
	22	Slide knob	RAC1713
	23	Operation knob	RAC1795
	24	Eject knob	RAC1772
	25	Power konb	RAC1809
	26	Door lens	RAH2171
	27	Mode knob A	RAC1802
	28	PIONEER badge	RAM1007
	29	Mode knob B	RAC1808
	30	Remain display paper	REE – 113
	31	Stabilizer panel	RAH1483
	32	FL lens	RAH2240
	33	Door pocket	RAH2232
	34	Front panel	RAH2236
NSP	35	Rear panel	RNA1683
	36	Connection cord with mini plug	PDE – 319
	37	Connection cord assembly	RDE1002
	38	Control cord	RDE1030
	39	Operating instructions (English/French)	RRE1077
	40	Pad (L)	RHA1111
	41	Pad (R)	RHA1112
	42	Packing case	RHG1455
	43	Sheet	RHX – 034
	44	Screw	BBZ30P060FZK
	45	Screw	BBZ30P080FMC
	46	Sheet	DEC1661
	47	Screw	IBZ30P150FCU
	48	Screw	BBZ26P060FMC
	49	Screw	ABZ30P080FMC
	50	Connection cord	RDE – 010
	51	Bonnet	REA1077
	52	Eject spring	RBH1340
	53	Spacer A	RHC1044
	54	Screw	IPZ26P080FMC
	55	Washer	WA52D080D025
	56	Stabilizer B	REB1085
	57	Operating instructions (German/Italian/Dutch/ Spanish/Portuguese/Swedish)	RRD1136
NSP	58	TRN 1 unit	RWZ2875

PACKING

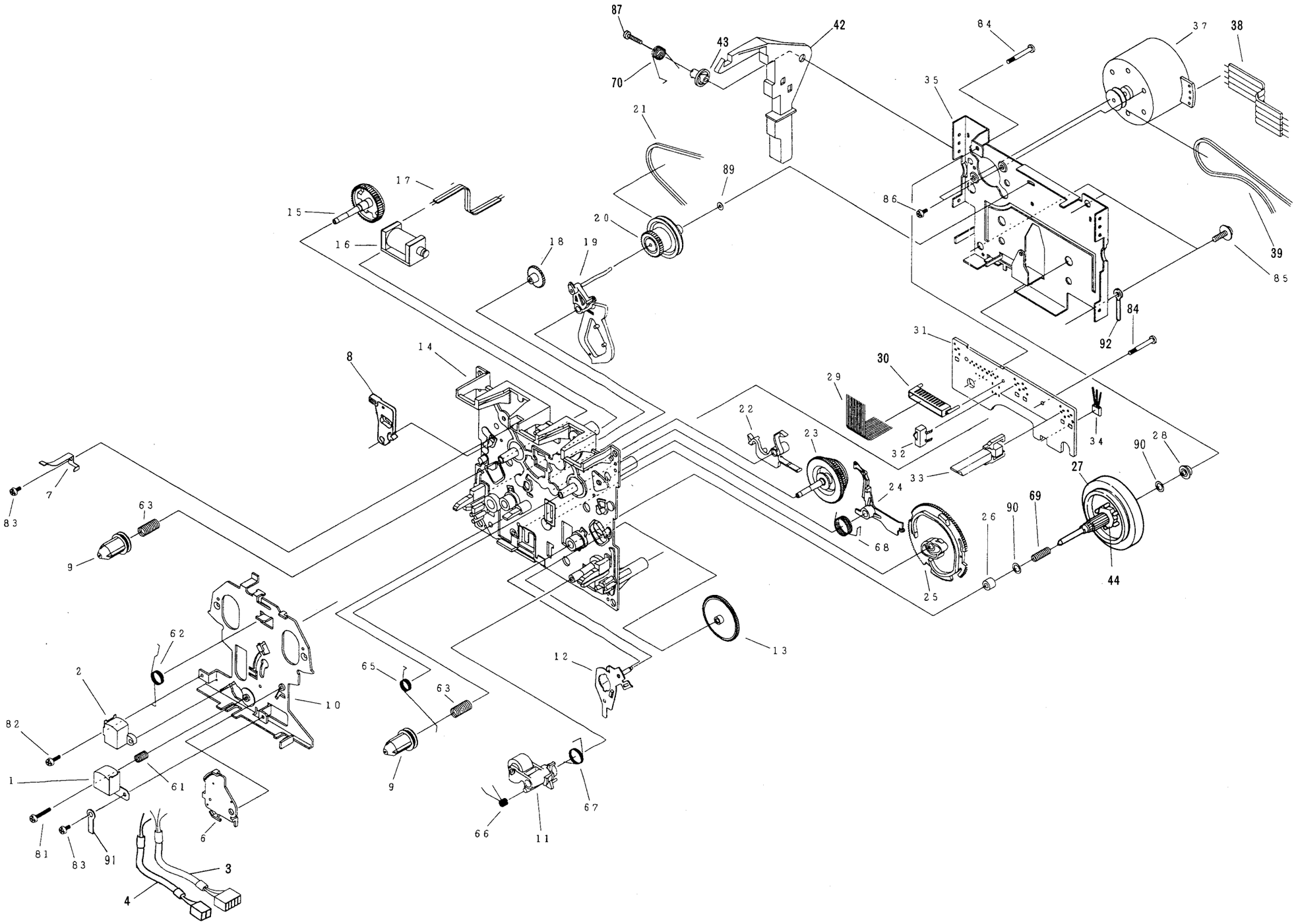


Exterior



NOTE: **Screws adjacent to ▼ mark on the product are used for disassembly.**

1.2 MECHANISM UNIT



Parts List

Mark	No.	Description	Part No.
	1	R/P HEAD	RPB1026
	2	E HEAD	RPB1027
	3	WIRE HEAD	RKP1404
	4	WIRE HEAD (E)	RKP1405
	6	ASS'Y ARM ASSIST	RXA1401
	7	SPRING CASSETTE	RBK1039
	8	EJECT LOCK	RNK1718
	9	CAP REEL	RNK1719
	10	CHASSIS HEAD	RNE1439
	11	ASS'Y PINCH ARM R	RXA1404
	12	ARM PLAY R	RNK1868
	13	GEAR PLAY	RNK1867
	14	CHASSIS OS.	RXA1417
	15	REEL GEAR	RNK1726
⚠	16	SOLENOID	RXP1020
	17	WIRE	RDC1006
	18	GEAR FF	RNK1723
	19	ASS'Y ARM FR	RXA1412
	20	ASS'Y PULLEY FR	RXA1413
	21	BELT FR	REB1158
	22	ARM BRAKE	RNK1724
	23	ASS'Y SUB REEL R	RXA1408
	24	ARM TRIGGER	RNK1722
	25	GEAR CAM	RNK1725
	26	SHAFT HOLDER	RNG1049
	27	ASS'Y FLYWHEEL R	RXA1415
	28	SHAFT HOLDER	RNG1004
	29	WIRE	RDD1260
NSP	30	HOLDER WIRE	RNK1683
	31	P.C. BOARD	RNP1347
	32	SWITCH MODE	RSN1020
	33	SWITCH (LEAF)	RSN1019
	34	HALL IC.	DN6851A
	35	BRACKET FW	RNE1438
	37	ASS'Y MOTOR	RXM1064
NSP	38	WIRE	RDD1012
	39	BELT MAIN	REB1223
	42	EJECT LEVER L	RNK1831
	43	COLLAR	RNK1704
	44	GEAR FW R	RNK1733
	61	SPRING (AZIMUTH)	RBH1296
	62	SPRING	RBH1284
	63	SPRING	RBH1286
	64	.....	
	65	SPRING	RBH1285
	66	SPRING	RBH1298
	67	SPRING	RBH1290
	68	SPRING	RBH1295
	69	SPRING	RBH1325
	70	SPRING (L)	RBH1319

Mark	No.	Description	Part No.
	81	SCREW (AZIMUTH)	RBA1096
	82	SCREW	RBA1029
	83	SCREW	PCZ20P040FMC
	84	SCREW	RBA1093
	85	SCREW	RBA1094
	86	SCREW	RBA1086
	87	SCREW	RBA1095
	89	WASHER	RBF1046
	90	WASHER	WA26D047D013
	91	KEEP WIRE	RNE1456
	92	KEEP WIRE	RNH1004

2. PCB PARTS LIST

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω → 56 × 10^1 → 561 ····· RD1/8PM 5 6 1 J
47k Ω → 47 × 10^3 → 473 ····· RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ····· RN2H 0 R 5 K
1 Ω → 010 ····· RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10^1 → 5621 ····· RN1/4PC 5 6 2 1 F

Mark	No.	Description	Part No.

LIST OF ASSEMBLIES

NSP	MOTHER UNIT		RWM1600
	├MAIN UNIT		RWZ2872
NSP	│ ├HX UNIT		RWX1034
	│ └1/f UNIT		RWX1087
	├OPERATE UNIT		RWZ2873
	├FL UNIT		RWZ2874
NSP	└TRN 1 UNIT		RWZ2875

MAIN UNIT

SEMICONDUCTORS

	IC223		BA10339
	IC554		BA15218
	IC221, IC701, IC902, IC1601		BA15218N
	IC510		BU2040
	IC351		CXA1198AP
	IC251		CXA1330S
	IC101		M5220L
⚠	IC1003, IC1004		NJM7812FA
⚠	IC1002		NJM78M05FA
	IC501		PD4445A
	IC1701		TC4050BP
	Q1001		2SA1283
	Q421, Q510, Q852, Q1005, Q1010		2SA1309A
	Q431, Q854		2SB1238X
	Q105, Q106, Q163, Q164, Q351, Q352, Q1006, Q1007		2SC3311A
	Q401, Q402		2SD1302
	Q857		2SD1858X
	Q254, Q258, Q353, Q354, Q403, Q701, Q702, Q1603, Q1604		2SD2144S
	Q553		2SK246
	Q161, Q162		2SK373
	Q165		DTA114ES
	Q332, Q762, Q841, Q842		DTA114TS
	Q355-Q358		DTC114ES
	Q422, Q432, Q503-Q506, Q551, Q552, Q853, Q901-Q904, Q1151-Q1165		DTC114TS
	Q167, Q168, Q255-Q257, Q259, Q260, Q507, Q855		DTC124ES
⚠	D1001, D1006, D1013-D1016		1SR35-100AVL
	D431, D434, D812		1SS252
	D161-D166, D251, D421-D425, D432, D433, D435, D502, D507, D510, D521-D527, D742, D807-D811, D814, D841-D844, D901-D903, D913, D921, D1011, D1602-D1604, D1620-D1622, D1701-D1705		1SS254
⚠	D1009, D1010		1SS254
⚠	D1002		MTZJ27C
	D765		MTZJ3.9B
⚠	D1031		MTZJ5.1B
⚠	D1004		MTZJ7.5B
	D501		MTZJ9.1A

COILS AND FILTERS

	L402		LFA121K
	L401 (F=105K)		RTD1039
	L351, L352 (L=103J)		RTF1102
	F251, F252		RTF1208

CAPACITORS

	C161, C162		CCPUSL100J50
	C103, C104		CEANL100M16
	C107, C108		CEANL330M16
	C251-C254, C321, C322, C555, C703, C704, C1601, C1602		CEAS010M50
	C255, C269, C281-C284, C408, C707, C708, C915, C916, C1016		CEAS100M50
	C132, C711, C1603, C1604		CEAS101M16
	C1018		CEAS220M50
	C351, C352		CEAS221M10
	C1010, C1013, C1015, C1605		CEAS221M16
	C1001		CEAS221M50
	C1007		CEAS222M16
	C285, C286		CEAS330M16
	C914, C1004		CEAS330M35

Mark	No.	Description	Part No.
	C913		CEAS331M6R3
	C1011		CEAS332M35
	C111, C120, C131, C361, C402, C403, C409, C513, C705, C1024		CEAS470M16
	C353–C356, C358		CEAS4R7M50
	C265, C266		CEASR22M50
	C267, C268, C273, C274		CEASR33M50
	C917, C918		CEASR47M50
	C287, C288		CFTXA103J50
	C261–C264		CFTXA222J50
	C404		CFTXA223J50
	C405, C406		CFTXA332J50
	C407, C553		CFTXA472J50
	C109, C110		CFTXA682J50
	C554		CGCYX103K25
	C503		CGCYX104K25
	C504		CGCYX123K25
	C505, C552		CGCYX223K25
	C551		CGCYX823K25
	C133, C509, C510, C514, C515, C910, C1606		CKCYF103Z50
	C357, C706, C769, C911, C919, C921, C1008, C1020-C1022, C1030, C1607, C1701, C2020		CKCYF473Z50
	C105, C106, C723, C724		CKPUYB101K50
	C923, C924		CKPUYB122K50
	C359, C360		CKPUYB221K50
	C101, C102, C851		CKPUYB681K50
	C401		CQPA822J100
RESISTORS			
	R502, R531 (22K)		RA4T223J
	R501 (38K)		RA4T683J
	R517, R1185, R1701 (22K)		RA5T223J
	R512 (68K)		RA6T683J
	R1186 (22K)		RA7T223J
	R518 (68K)		RA9T683J
	R321, R322 (560Ω)		RCN1024
	R1702 (11K/22K)		RCX1020
	R413		RD1/2LF010J
	R1001		RD1/2LF152J
	R421		RD1/2LF181J
	R411		RD1/2LF271J
⚠	R1020 (47Ω)		RFA1/4L470J
	R1031 (820Ω)		RS2LMF821J
	VR101, VR102 (4.7K)		RCP1020
	VR321, VR322, VR551-VR553 (22K)		RCP1046
	VR852 (15K)		RCP1090
	VR2003		RCS1028
	VR2002		RCV1095
	OTHER RESISTORS		RD1/6PM□□□J
OTHERS			
	CN851 CONNECTOR (13P)		KPE13
	JA1602 MINI JACK		PKN1005
	JA701 PIN JACK (4P)		RKB-020
	JA2003 HEADPHONE JACK		RKN1002
	JA902, JA903 REMOTE CONTROL JACK		RKN1004
	X501 CERAMIC RESONATOR (4.19MHz)		VSS1014

HX UNIT

SEMICONDUCTORS

	IC601	UPC1297CA
	Q601, Q602	2SA1309A
	Q603	DTC124ES
	D601, D602	1SS254

COILS

	L601, L602 (L=4.6mH, Q=25, F=105KHz)	RTD1046

CAPACITORS

	C609, C610	CCCSL101K500
	C615, C617	CEAS100M50
	C616	CEAS4R7M50
	C614	CEASR10M50
	C601, C602	CFTXA103J50
	C605, C606	CFTXA223J50
	C607, C608	CGCYX473K25
	C613	CKPUYB101K50
	C603, C604	CKPUYB821K50
	C611, C612 (C=430P, V(DC)=500)	RCG1005

RESISTORS

	VR601, VR602	VRTB6HS223
	OTHER RESISTORS	RD1/6PM□□□J

1/f UNIT

SEMICONDUCTORS

	IC1111, IC1131	BA15218N
	Q1131-Q1136	DTC124ES
	D1111	1SS254

CAPACITORS

	C1141-C1143	CEAS010M50
	C1131, C1132, C1144, C1147, C1148	CEAS470M16
	C1139, C1140	CEAS4R7M50
	C1119	CEASR47M50
	C1133, C1134	CGCYX152K25
	C1135, C1136	CGCYX272K25
	C1115, C1116	CGCYX332K25
	C1120	CGCYX473K25
	C1137, C1138	CGCYX562K25
	C1111, C1112	CGCYX822K25
	C1113	CKPUYB101K50

RESISTORS

	ALL RESISTORS	RD1/6PM□□□J

OPERATE UNIT

SEMICONDUCTORS

	Q1401	DTA114TS
	Q1451, Q1452	DTC124ES
	D1451	SEL6410G
	D1452	SEL6C10R

Mark	No.	Description	Part No.
SWITCHES			
	S1401-S1404, S1406-S1411		RSG1030
CAPACITORS			
	C1452		CEAS100M16
RESISTORS			
	ALL RESISTORS		RD1/6PM□□□J

FL UNIT

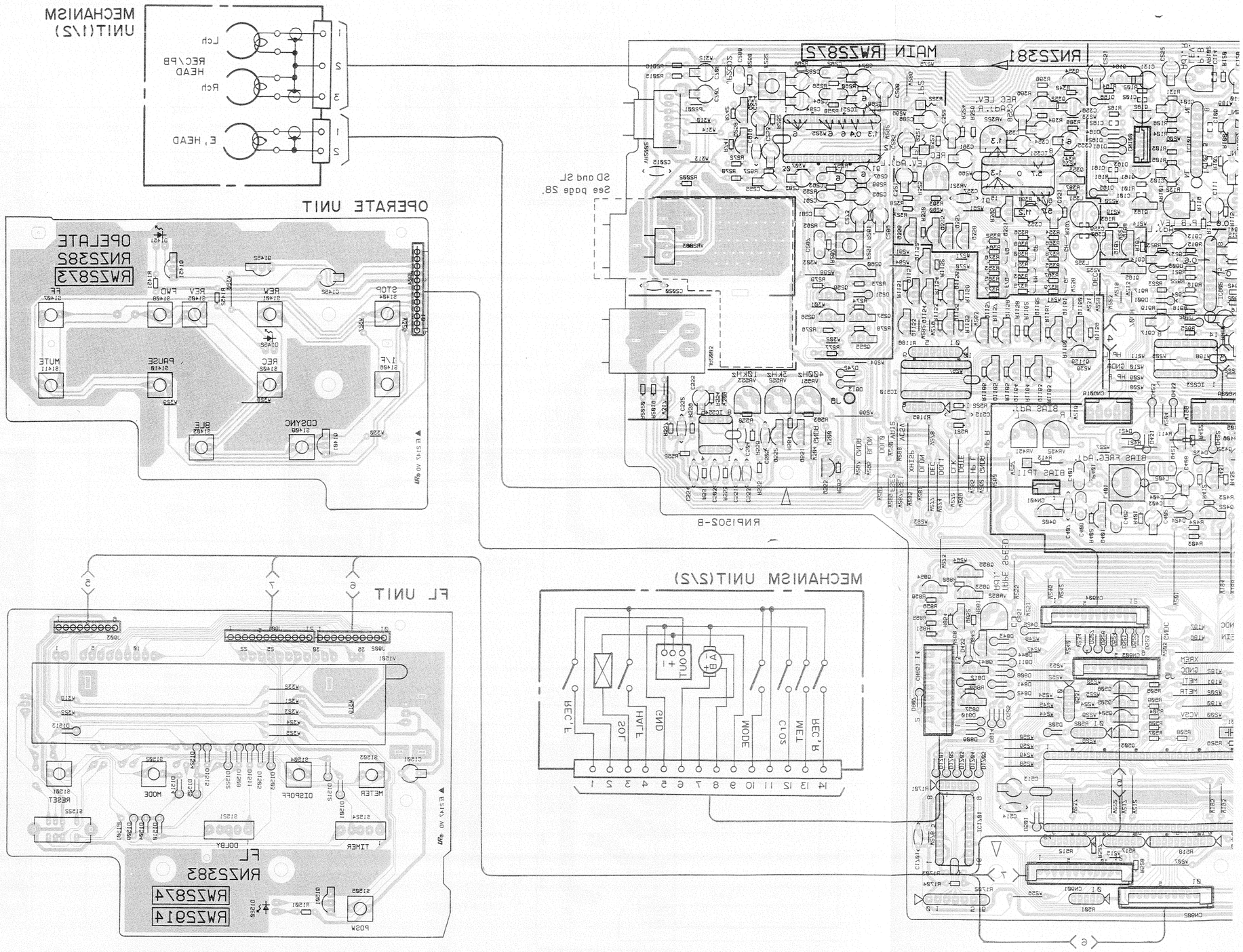
SEMICONDUCTORS			
	Q1501		DTC124ES
	D1501, D1503-D1505, D1510-D1515, D1522, D1524, D1525		1SS254
	D1520		SEL6C10R
SWITCHES			
	S1505		RSG1030
	S1501-S1503		RSG1034
	S1521, S1524		RSH1041
CAPACITORS			
	C1501		CEAS100M50
RESISTORS			
	ALL RESISTORS		RD1/6PM□□□J
OTHERS			
	V1501 FL INDICATOR TUBE		RAW1124

TRN 1 UNIT

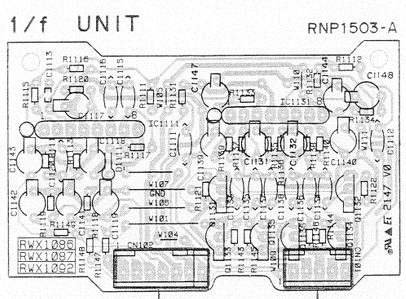
TRN1 unit has no service part.

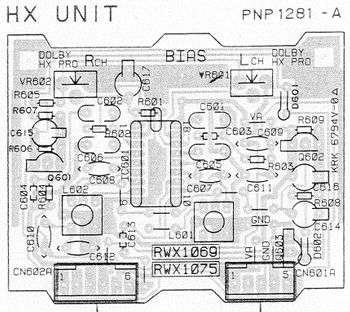
3. PCB CONNECTION DIAGRAM

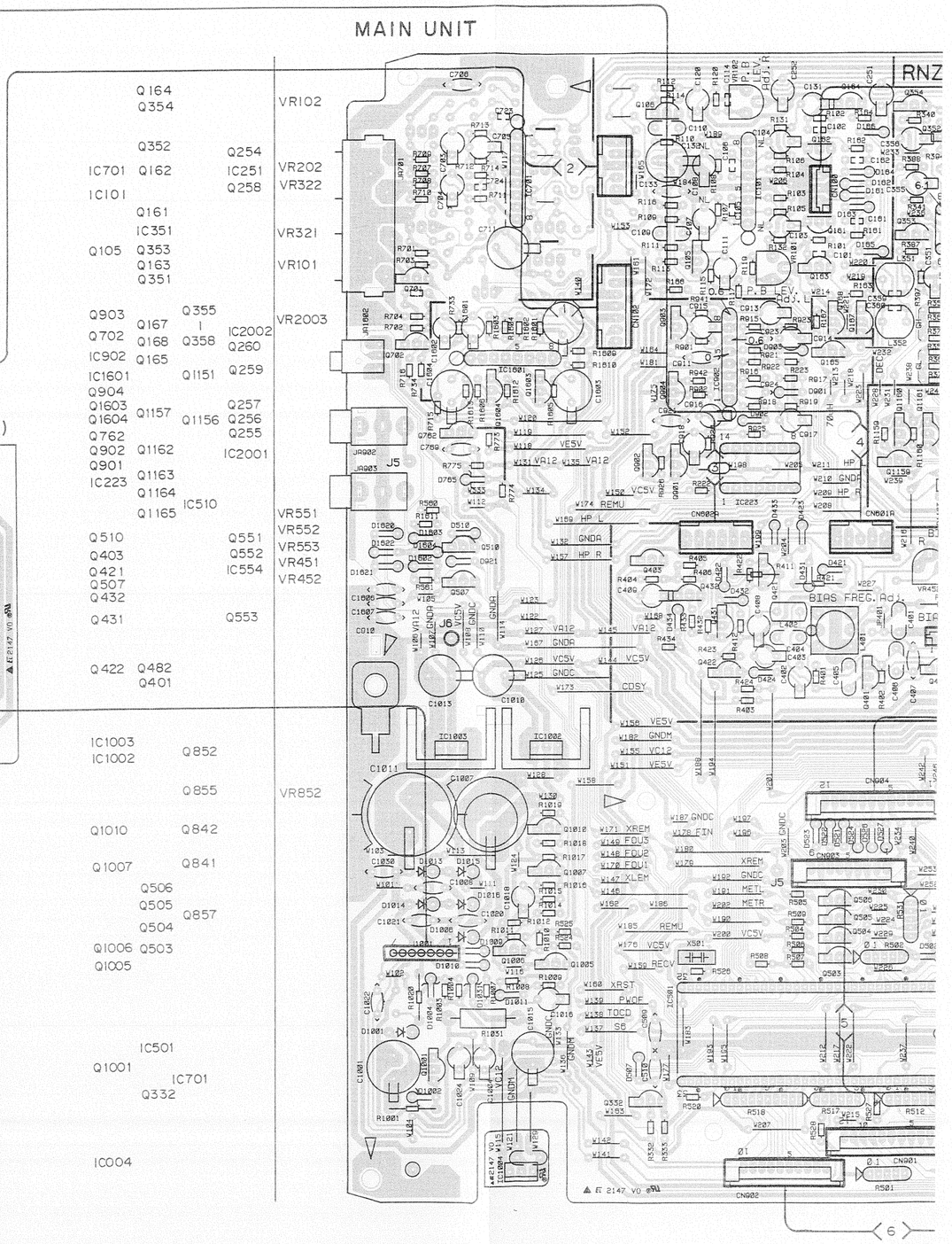
- View from soldering side



• View from component side



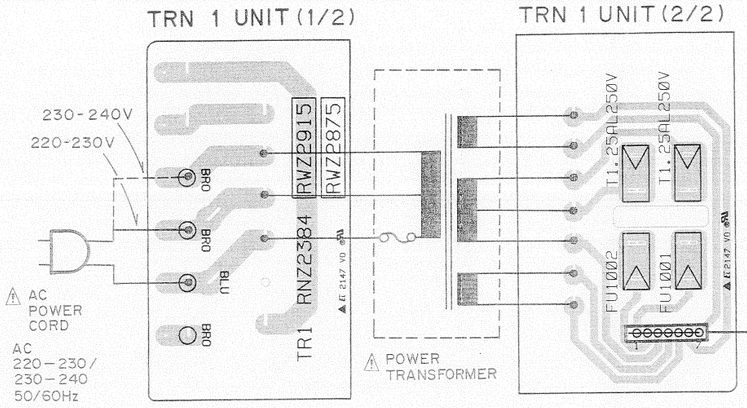


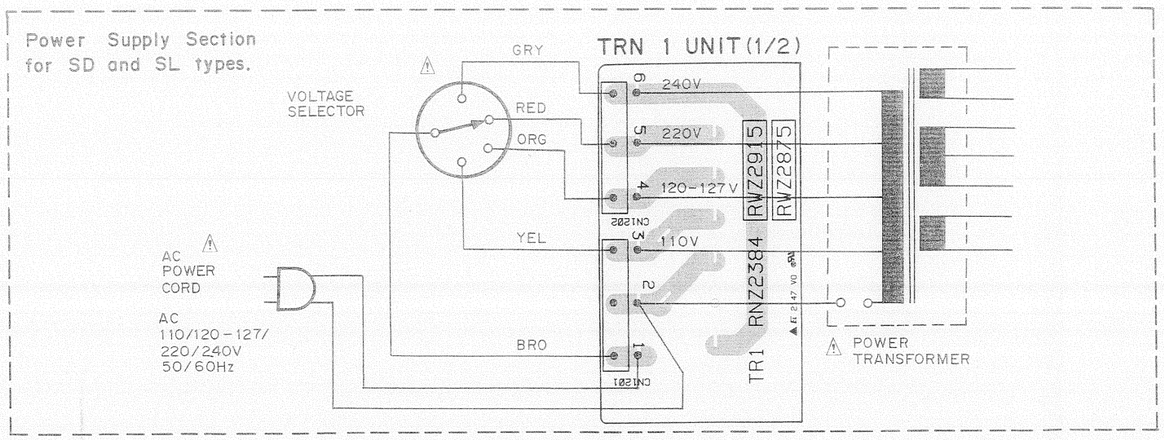


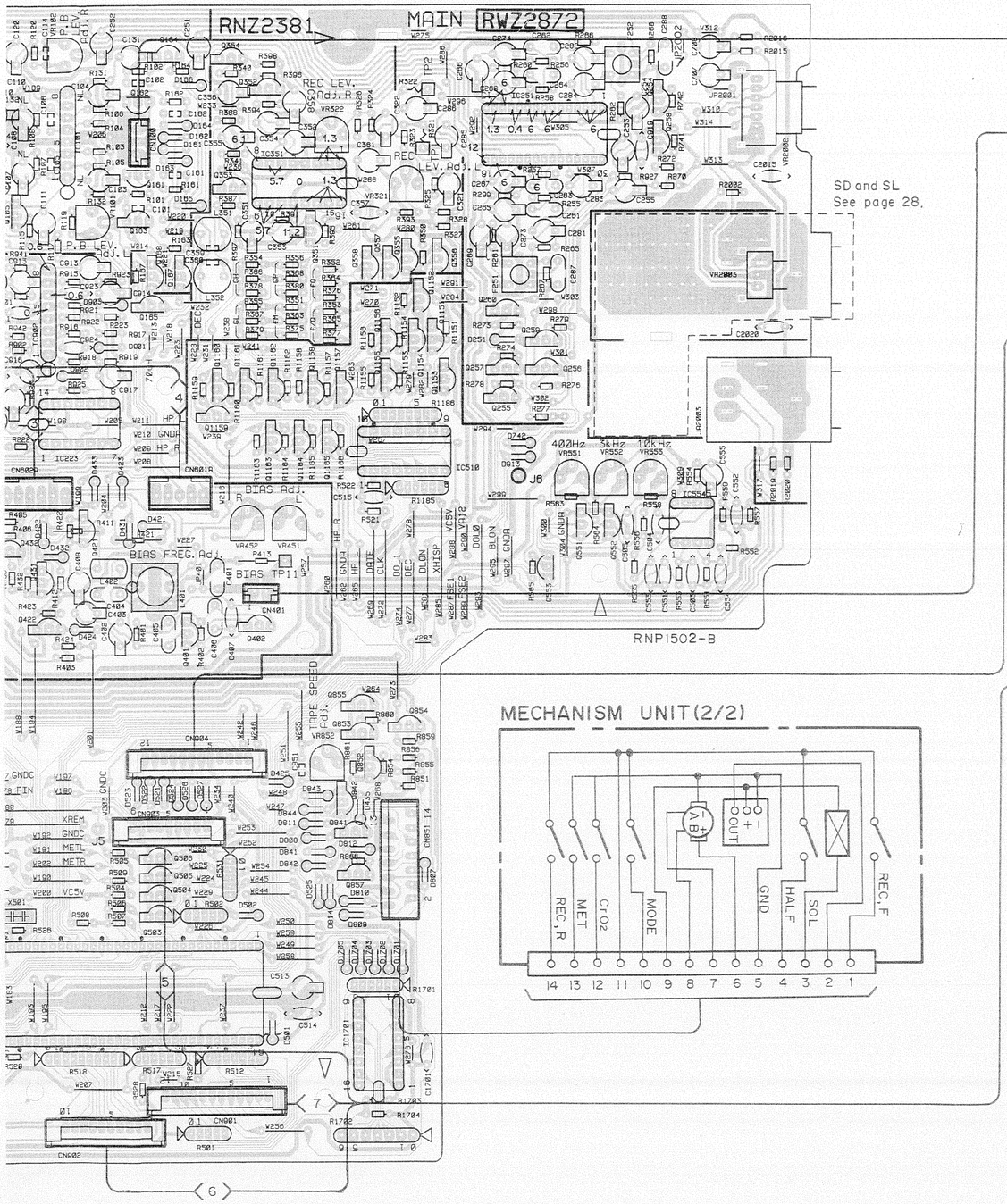
Line Voltage Selection

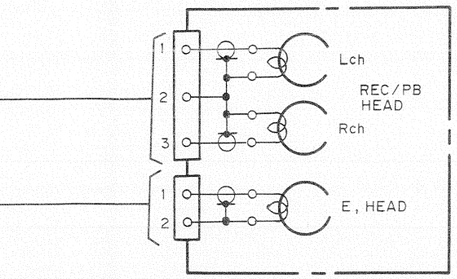
Line voltage can be changed with the follows:
1. Disconnect the AC power cord.
2. Remove the cover
3. Change the connection of TRN 1 UNIT primary pins.
4. Stick the line voltage label on the rear panel.

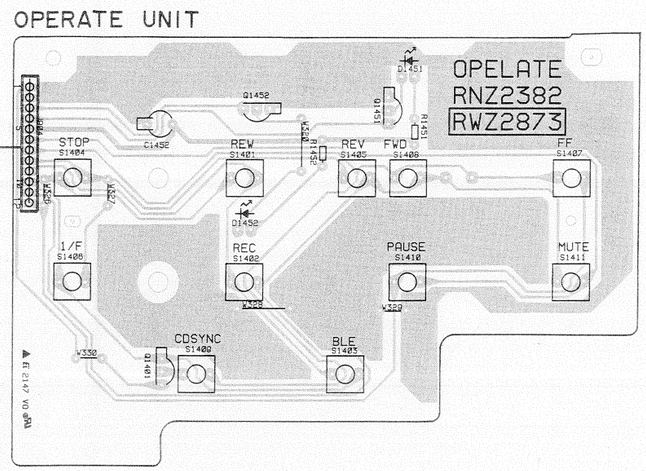
Parts No	Description
AAX-193	220 V label
AAX-192	240 V label

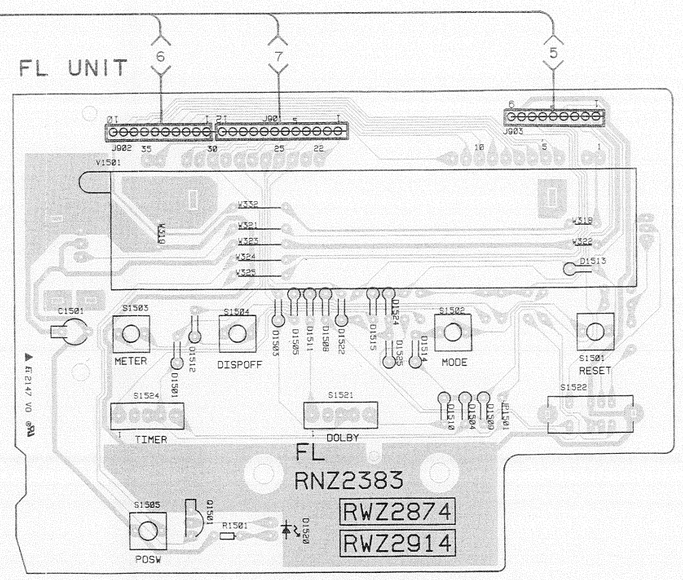








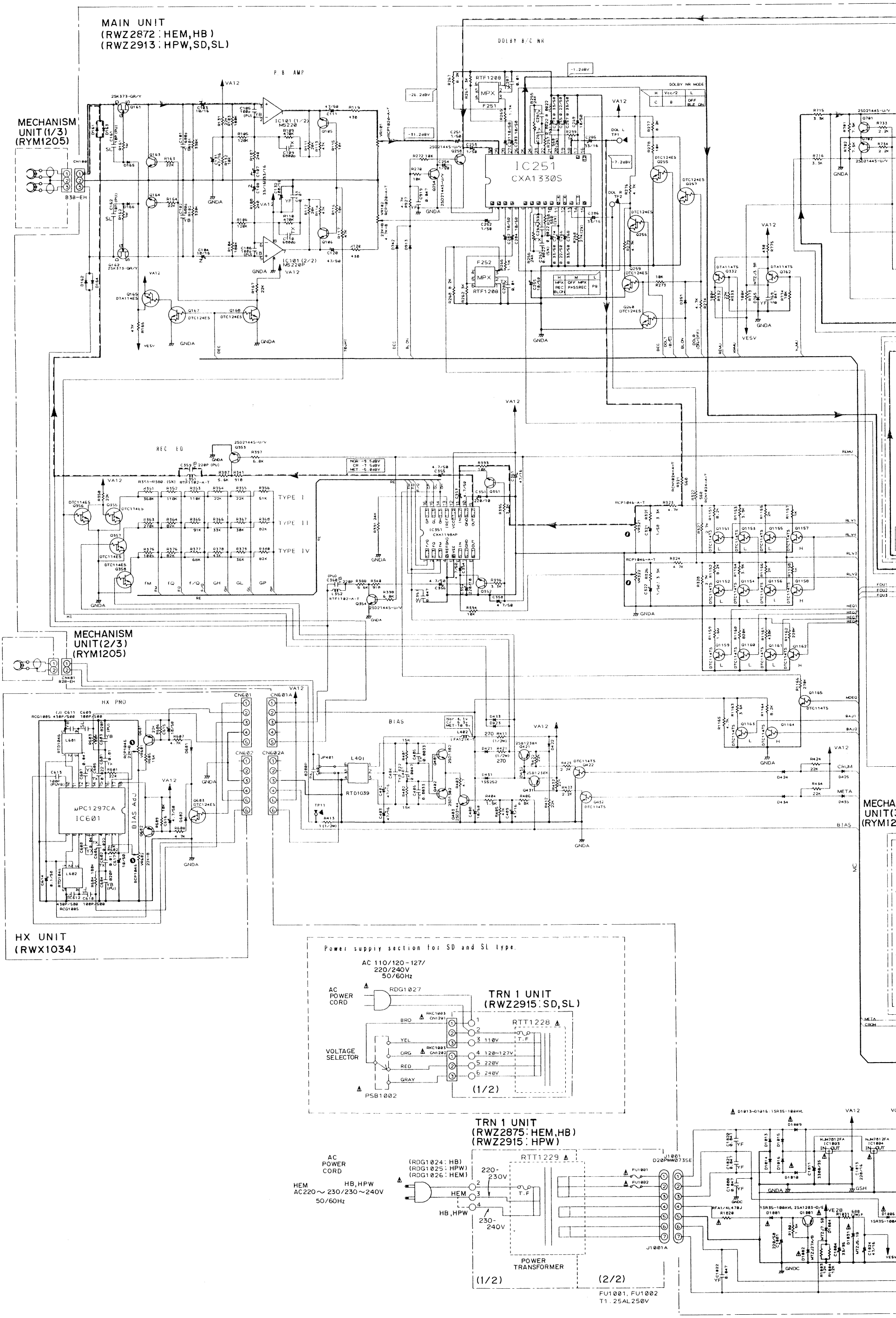




P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

4. SCHEMATIC DIAGRAM



INPUT BUFFER

HPW, SD

HEM, HB Only.

*1

	R2015, R2016
HEM, HB	1.2K
HPW, SD, SL	2.2K

SOUND EQ TR CONDITION

	PORT	OFF	CAR
SEQ0	L	(L)	H
SEQ1	H	L	H
SEQ2	L	H	L

H PHONE AMP

1/f UNIT (RWX1087)

400Hz L.P.F

3kHz Buffer AMP

400Hz LEVEL ADJ.

3kHz LEVEL ADJ.

10kHz LEVEL ADJ.

SYSTEM CONTROL

METER AMP

MECHANISM UNIT(3/3) (RYM1205)

REC. F
SOL
HALF
GND
MODE
Cr
MET
REC. R

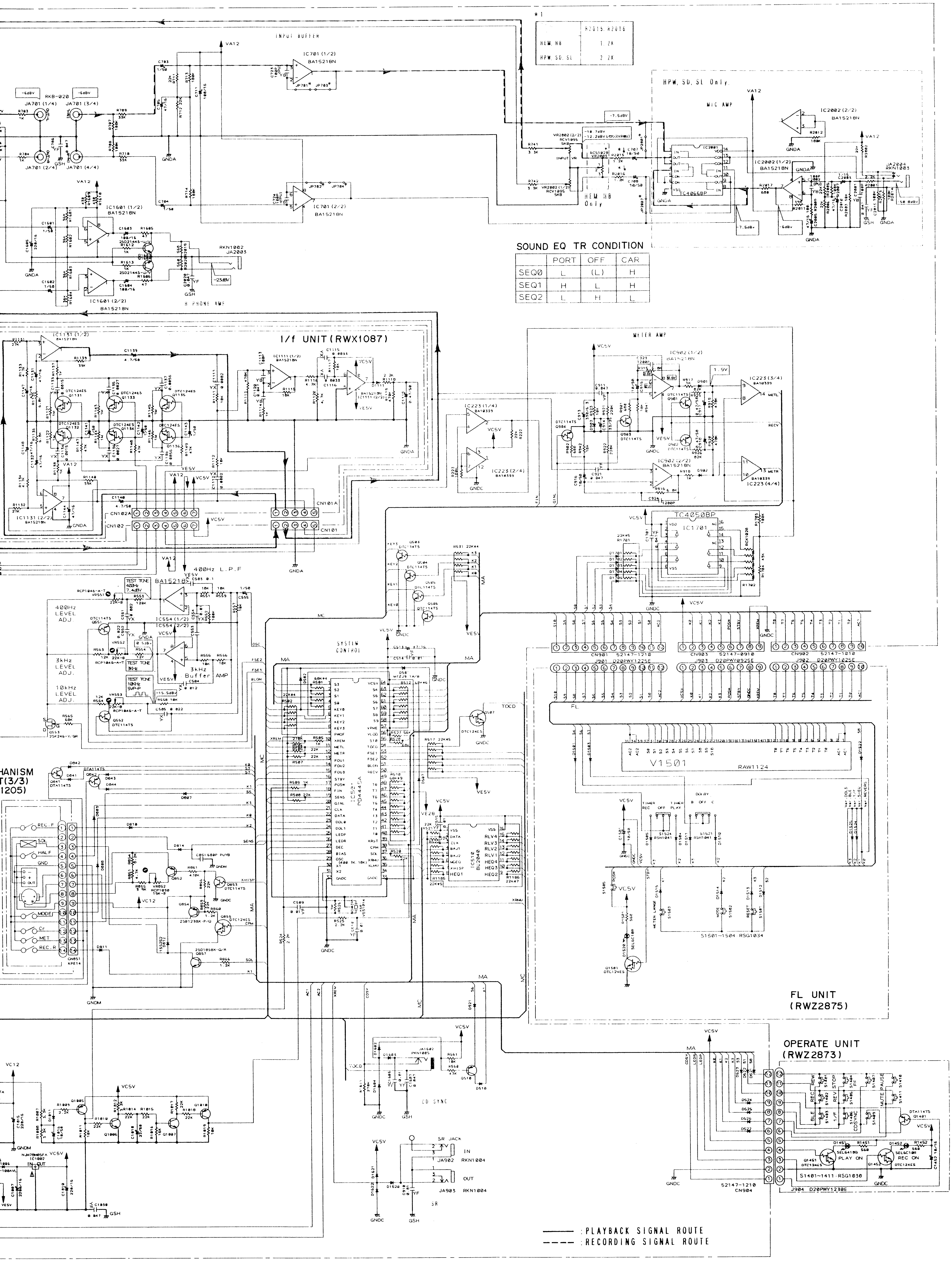
ED SYNC

SR JACK
IN JA902 RKN1004
OUT JA903 RKN1004
SR

J1001 D20PWW0735E
J1001A
(2/2)
FU1001, FU1002
T1 : 25AL250V

——— : PLAYBACK SIGNAL ROU
- - - - : RECORDING SIGNAL RO

A B C D E F


INPUT BUFFER
IC701 (1/2) BA15218N
IC701 (2/2) BA15218N
JA701 (1/4) JA701 (3/4) JA701 (2/4) JA701 (4/4)
RKB-020
H PHONE AMP
IC1601 (1/2) BA15218N
IC1601 (2/2) BA15218N
RKN1002 JA2003
HPW, SD, SL Only.
MIC AMP
IC2001 TC4066BP
IC2002 (1/2) BA15218N
IC2002 (2/2) BA15218N
JA2004 RKN1003
HEM HB Only
1/f UNIT (RWX1087)
METER AMP
IC902 (1/2) BA15218N
IC902 (2/2) BA15218N
IC223 (1/4) BA10339
IC223 (2/4) BA10339
IC223 (3/4) BA10339
IC223 (4/4) BA10339
TC4050BP IC1701
400Hz L.P.F
3kHz Buffer AMP
400Hz LEVEL ADJ.
3kHz LEVEL ADJ.
10kHz LEVEL ADJ.
SYSTEM CONTROL
IC501 PD4445A
IC510 BU2040
V1501 RAW1124
FL UNIT (RWZ2875)
OPERATE UNIT (RWZ2873)
CD SYNC
SR JACK
JA902 RKN1004
JA903 RKN1004
CN901 52147-1210
CN903 52147-0910
CN902 52147-1010
J901 D20PWY1225E
J903 D20PWY0925E
J902 D20PWY1025E
CN904 52147-1210
J904 D20PWY1230E
S1501~1504 RSG1034
S1401~1411 RSG1030

*1

	R2015, R2016
HEM, HB	1.2K
HPW, SD, SL	2.2K

SOUND EQ TR CONDITION

	PORT	OFF	CAR
SEQ0	L	(L)	H
SEQ1	H	L	H
SEQ2	L	H	L

———— : PLAYBACK SIGNAL ROUTE
- - - - : RECORDING SIGNAL ROUTE

5. ADJUSTMENTS

5.1 MECHANICAL ADJUSTMENT

1. Tape speed Adjustment			
Mode	Test tape	Adjustment position	Specification rating (playback frequency)
PLAY	Play the STD-301 tape (3kHz)	VR852	3020Hz ± 5Hz

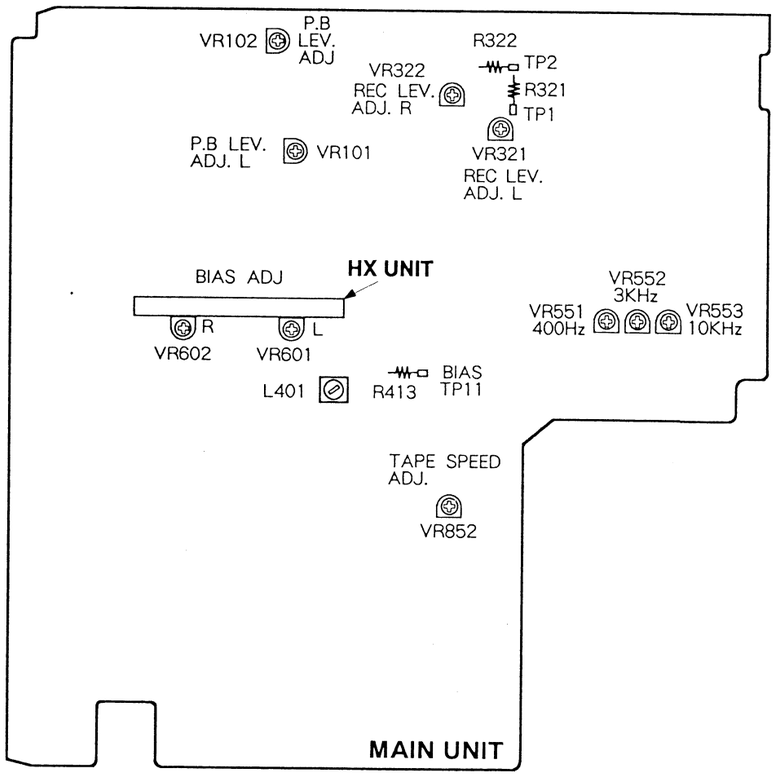


Fig. 5–1 Adjusting points

5.2 ELECTRICAL ADJUSTMENTS

Adjustment Conditions

1. The mechanical adjustments must be completed first.
2. The head must be cleaned and demagnetized.
3. Turn power on allow the deck to warm up for at least a few minutes before commencing any electrical adjustments.
4. The reference signal is 0 dBV=1 Vrms.
5. Connect a 50 kΩ (or between 47k to 52 kΩ) load resistance to the OUTPUT terminals.
6. Unless otherwise specified, the switches listed below are left in the positions indicated.
   DOLBY NR : OFF
   TAPE SELECTOR : NORM

Test Tapes

STD–331E : Playback adjustments (See Fig. 5–2)
STD–631 : NORMAL blank tape
STD–621 : CrO_2 blank tape
STD–610 : METAL blank tape

* As the reference recording level is 250 nwb/m for STD–331E, the recording level will be higher by 4 dB for STD–331B (160 nwb/m). When adjusting, pay carefull attention to the type of tape used.

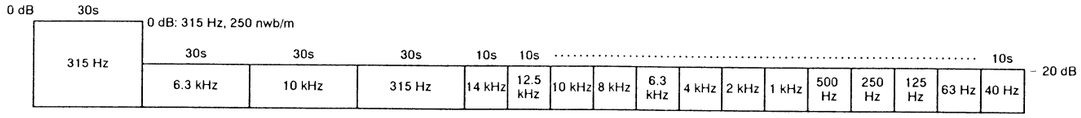


Fig. 5–2 Constants of the test tape STD–331E

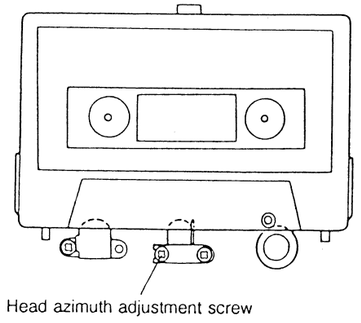


Fig. 5–3 Head azimuth adjustment

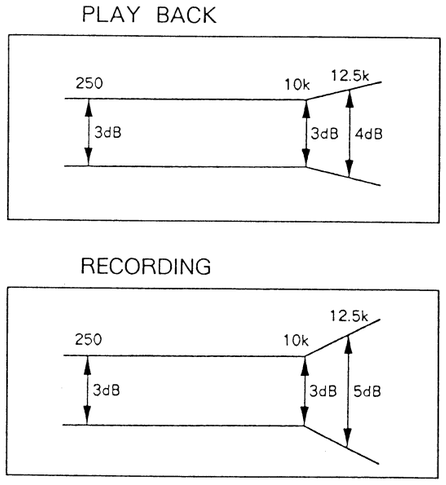


Fig. 5–4 Frequency response zone

List of Adjustments

Playback sections

1. Head azimuth adjustment.
2. Playback level adjustment.

Recording sections

1. Bias oscillator adjustment.
2. Recording bias adjustment.
3. Recording level adjustment.
4. Level meter check
5. AUTO BLE adjustment.

NOTE: This unit has an automatic tape selection feature.

PLAYBACK SECTION

1. Head Azimuth Adjustment

- Turn VR101, 102 to mechanical center positions.

No.	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1.	PLAY	Play the 10 kHz/–20 dB section of STD–331E test tape.	Head azimuth adjustment screw. (See Fig. 5–3)	LINE OUT	Maximum playback signal level.	
2.	STOP	Lock the screw with screw lock after completing adjustment.				

2. Playback Level Adjustment

- This adjustment determines the DOLBY NR level, and must be performed with great care.

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	PLAY	Play the 315 Hz/0 dB section of the STD–331E test tape.	Deck	VR101 (Lch) VR102 (Rch)	TP. 1 (Lch) TP. 2 (Rch)	–6.7 dBV	This adjustment must be performed accurately for proper Dolby level setting.

RECORDING SECTION

1. Bias Oscillator Adjustment

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	REC	Load the STD–610 test tape with no input signal.	Deck	L401	TP. 11	105 kHz ± 0.3 kHz	

2. Recording Bias Adjustment

- After the adjustment, caution should be exercised so as not to become under bias by checking the distortion rate.

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	REC	Load the STD-631 test tape. Record the 315 Hz and 6.3 kHz signals at –20 dBV input level and playback.	Deck	VR601 (Lch) VR602 (Rch)	LINE OUT	Repeatedly record, playback and adjust so that the playback level of 6.3 kHz signal becomes + 0.5dB ± 0.5 dB when compared with the 315 Hz signal.	

3. Recording Level Adjustment

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	REC/ PAUSE	Apply a 315 Hz signal to the line input terminals, load the STD–631 test tape.	Volume of the output level of the oscillator		TP. 1 (Lch) TP. 2 (Rch)	–11.2 dBV	
2.	REC/ PLAY	Record the above signal onto the STD–631 test tape, and playback.	Deck	VR321 (Lch) VR322 (Rch)		Repeatedly record, playback and adjust so that the playback signal level becomes –11.2dBV.	
3.	REC/ PLAY	Record the above signal onto the STD–621 test tape, and playback.	Check			–11.2 dBV ± 1.5 dB	
4.	REC/ PLAY	Record the above signal onto the STD–610 test tape, and playback.	Check			–11.2 dBV ± 1.5 dB	

Note for Schematic Diagram (Type 6)

1. **When ordering service parts, be sure to refer to "PARTS LIST of EXPLODED VIEWS" or "PCB PARTS LIST".**

2. **Since these are basic circuits, some parts of them or the values of some components may be changed for improvement.**

3. **RESISTORS:**
   Unit: k:kΩ, M:MΩ, or Ω unless otherwise noted.
   Rated power: 1/4W, 1/6W, 1/8W, 1/10W unless otherwise noted.
   Tolerance: (F): ±1%, (G): ±2%, (K): ±10%, (M): ±20% or ±5% unless otherwise noted.

4. **CAPACITORS:**
   Unit: p:pF or μF unless otherwise noted.
   Ratings: capacitor (μF)/ voltage (V) unless otherwise noted.
   Rated voltage: 50V except for electrolytic capacitors.

5. **COILS:**
   Unit: m:mH or μH unless otherwise noted.

6. **VOLTAGE AND CURRENT:**
   ⌐¬ : DC voltage (V) in STOP mode unless otherwise noted.
   ⇦ mA or ← mA: DC current in STOP mode unless otherwise noted.

7. **OTHERS:**
   - ➡ : Signal route.
   - ⊘ : Adjusting point.
   - ▼ (Red) : Measurement point.
   - The ⚠ mark found on some component parts indicates the importance of the safety factor of the parts. Therefore, when replacing, be sure to use parts of identical designation.

8. **SWITCHES** (Underline indicates switch position):

OPERATE UNIT
S1401 : REW
S1402 : REC
S1403 : BLE
S1404 : STOP
S1405 : REV
S1406 : 1/F
S1407 : FF
S1409 : CD SYNC
S1410 : PAUSE
S1411 : MUTE

FL UNIT
S1501 : RESET
S1502 : MODE
S1503 : METER LANGE
S1505 : POSW
S1521 : DOLBY B – OFF – C
S1524 : TIMER REC – OFF – PLAY

4. Level Meter Check

No.	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1.	REC/ PAUSE	Apply a 315 Hz signal to the line input terminals.	Volume of the output level of the oscillator	TP. 1 (Lch) TP. 2 (Rch)	Check that the level meters "0 dB" light up within −7.2 dBV ± 2 dB of the signal output level.	

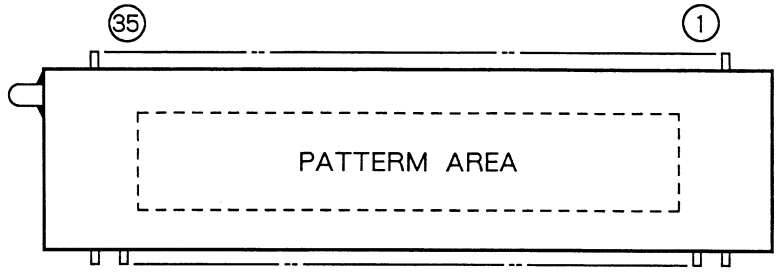
5. AUTO BLE Adjustment

- BLE adjustment should be performed after all other adjustments are completed.
- This adjustment should be performed in the test mode.
- Entering the Test Mode.
  Turn on the power, and after more than 4 seconds, press the "COUNTER RESET" button, "COUNTER MODE" button and ▮▮ (PAUSE) button simultaneously.
- Releasing the Test Mode.
  Press the "COUNTER RESET" button.

No.	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1.	–	Set to test mode.	–	–	–	
2.		Press the AUTO BLE key on the front panel.	Level meter Lch	VR551	Adjust the Lch segment which is lit until Rch is not lighting up. Lch ■→⬚ Rch ■■□■■ (■: light up □: not light up)	400 Hz adjustment (Test mode 1 FL indication 1)
3.		Press the AUTO BLE key on the front panel.		VR552		3 kHz adjustment (Test mode 2 FL indication 2)
4.		Press the AUTO BLE key on the front panel.		VR553		10 kHz adjustment (Test mode 3 FL indication 3)

6. FL INFORMATION

● RAW1124 (V1501)

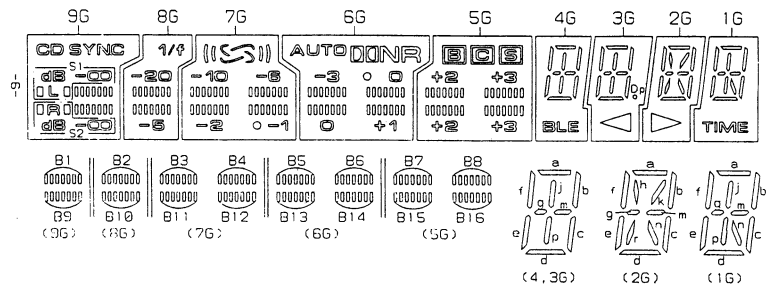


PIN CONNECTION

PIN NO.	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CONNECTION	F2	F2	NP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	NP	NP	NP	NP	NP	NP	NP	NP	NP	9G	8G	7G	6G	5G	4G	3G	2G	1G	NP	F1	F1

NOTE 1) F1,F2 --- Filament
2) NP ------ No pin
3) DL ------ Datum Line
4) 1G~9G --- Grid

GRID ASSIGNMENT



ANODE CONNECTION

	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	B1	B2	B3	B5	B7	a	a	a	a
P2	-	-	B4	B6	B8	b	b	b	b
P3	B9	B10	B11	B13	B15	f	f	f	f
P4	-	-	B12	B14	B16	g	g	g,m	g
P5	S1	-20	-10 -6	-3 ○ ○	+2 +3 (Upper)	m	m	k,r	m
P6	S2	-5	-2 ○-1	○ +1	+2 +3 (Under)	c	c	c	c
P7	-	-	∽	-	-	e	e	e	e
P8	-	-	∽	-	-	d	d	d	d
P9	CD SYNC	1/f	( )	AUTO	B	j,p	j,p	h	j,p
P10	-	-	( )	DNR	C	-	Dp	n	n
P11	-	-	-	-	S	BLE	◁	▷	TIME

7. FOR HB, HPW, SD AND SL TYPES

CONTRAST OF MISCELLANEOUS PARTS

NOTES:
- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

HB, HPW, SD, SL and HEM have the same construction except for the following:

Mark	Symbol & Description	Part No.					Remarks
		HEM type	HB type	HPW type	SD type	SL type	
NSP	Mother unit	RWM1600	RWM1600	RWM1609	RWM1609	RWM1609	
	Main unit	RWZ2872	RWZ2872	RWZ2913	RWZ2913	RWZ2913	
NSP	TRN 1 unit	RWZ2875	RWZ2875	RWZ2915	RWZ2915	RWZ2915	
⚠	AC power cord	RDG1026	RDG1024	RDG1025	RDG1027	RDG1026	
⚠	Power transformer (AC220 – 230/230 – 240V)	RTT1229	RTT1229	RTT1229	.....	.....	
⚠	Power transformer (AC110/120 – 127/220/240V)	.....	.....	.....	RTT1228	RTT1228	
⚠	Voltage selector (AC110/120 – 127/220/240V)	.....	.....	.....	PSB1002	PSB1002	
	Balance knob	RAC1705	RAC1705	.....	.....	.....	
	FL lens	RAH2240	RAH2240	RAH2292	RAH2292	RAH2292	
	Front panel	RAH2236	RAH2236	RAH2237	RAH2237	RAH2237	
	BS pin cap	.....	VEC1616	.....	.....	.....	For AC power cord
NSP	Rear panel	RNA1683	RNA1683	RNA1731	RNA1684	RNA1741	
	Packing case	RHG1455	RHG1458	RHG1458	RHG1456	RHG1456	
	Pad spacer A	.....	RHC1039	RHC1039	.....	.....	For packing
	Pad spacer B	.....	RHC1041	RHC1041	.....	.....	For packing
	Operating instructions (German/Italian/ Dutch/Swedish/Spanish/Portuguese)	RRD1136	.....	.....	.....	.....	
	Operating instructions (Spanish)	.....	.....	.....	RRD1139	.....	

MAIN UNIT

RWZ2913 and RWZ2872 have the same construction except for the following:

Mark	Symbol & Description	Part No.		Remarks
		RWZ2872	RWZ2913	
	IC2001	.....	TC4066BP	
	IC2002	.....	BA15218N	
	C2001, C2002	.....	CKPUYB101K50	
	C2003	.....	CEAS010M50	
	C2005, C2010	.....	CEAS470M16	
	C2015	.....	CKCYF473Z50	
	R2001	.....	RD1/6PM222J	
	R2002, R2005, R2006	.....	RD1/6PM223J	
	R2003	.....	RD1/6PM103J	
	R2007, R2013, R2014	.....	RD1/6PM104J	
	R2009	.....	RD1/6PM181J	
	R2011	.....	RD1/6PM393J	
	R2012	.....	RD1/6PM184J	
	R2015, R2016	RD1/6PM122J	RD1/6PM222J	
	R2017	.....	RD1/6PM681J	
	VR2003 (Balance VR)	RCS1028	.....	
	JA2004	.....	RKN1003	

TRN 1 UNIT

Although RWZ2915 and RWZ2875 are different in part number, they consist of the same components.

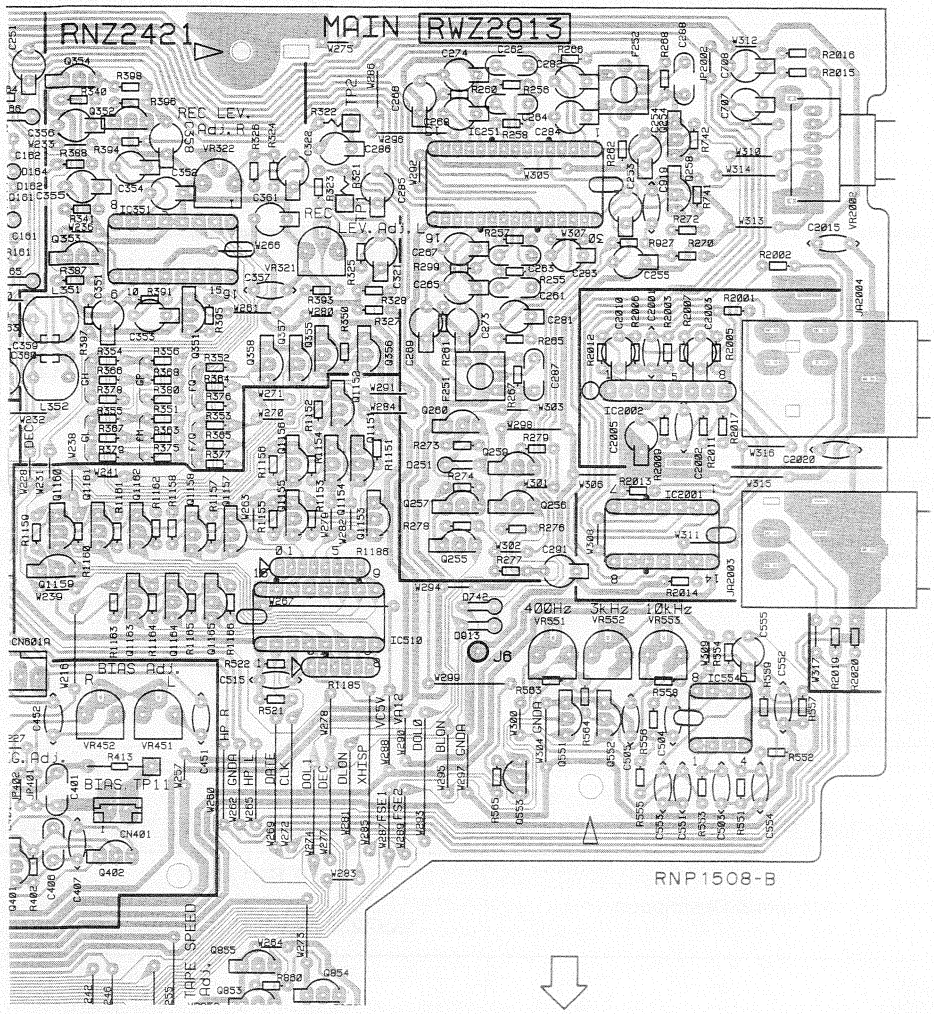
● PCB DIAGRAM (SD AND SL TYPES ONLY)

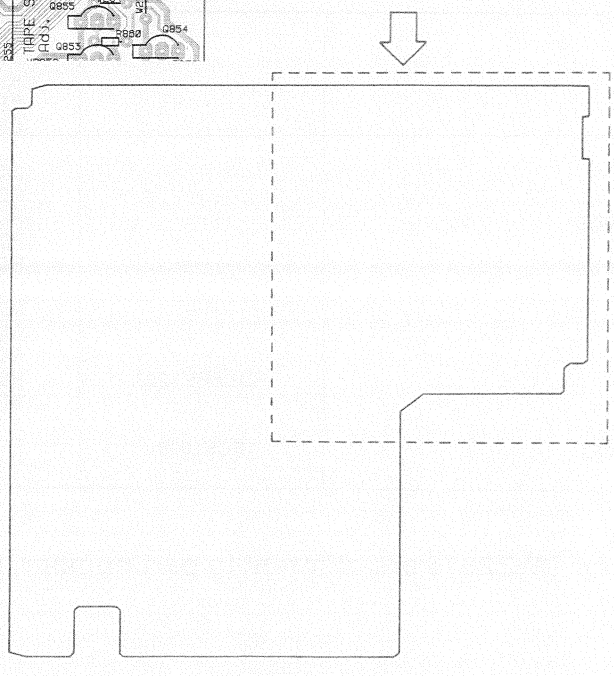
Note: Assembly which is different in CT-S320/SD, SL and CT-S320/HEM, the PCB diagram is shown below.

For schematic diagram, refer to page 21.

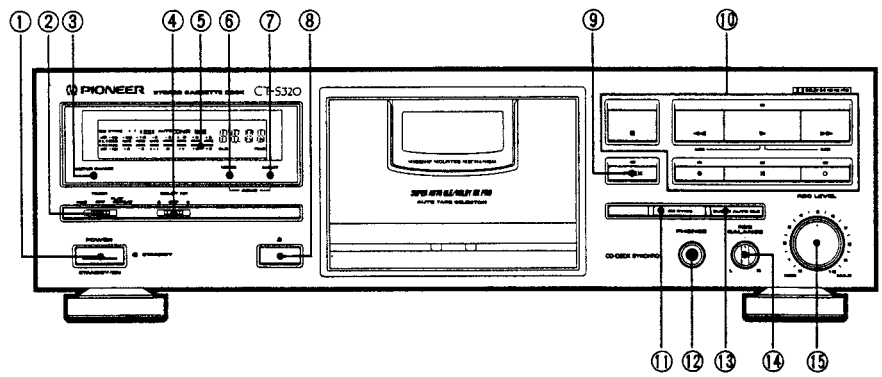
• View from component side

MAIN UNIT





8. PANEL FACILITIES



●Illustration shows U.K. and European model.

① POWER STANDBY/ON switch
The POWER switch activates the secondary transformer only. Even when the switch is in the STANDBY position, there will be a power flow to the deck's circuits as long as the power cord is connected to a power outlet.

② Timer mode/repeat play switch (TIMER REC/OFF/PLAY-REPEAT)

③ Level meter range selector button (METER RANGE)
Press to select wide or expanded range on the level meter.

④ Dolby* NR switch (DOLBY NR B/OFF/C)

*

- *Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.*
- *"DOLBY", the double-D symbol ⊡⊡ and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.*

⑤ Function display

⑥ Tape counter mode button (COUNTER MODE)

⑦ Tape counter reset button (COUNTER RESET)

⑧ Eject button (⏏)
- If the tape is moving (recording, playback, tape winding, etc.), press the stop (■) button before pressing this button.

⑨ FLEX (1/f) button

⑩ Operation buttons

◀◀/MS : Rewind/music search
■ : Stop
▶ : Playback
▶▶/MS : Fast forward/music search
● : Recording
❚❚ : Pause
○ : Recording mute

⑪ CD · DECK SYNCHRO recording button (CD SYNCHRO)

⑫ Headphones jack (PHONES)

⑬ SUPER AUTO BLE button

⑭ Recording balance control (REC BALANCE) (U.K. and European models)

⑭ Microphone jack (MIC) (Multivoltage and Australian models)
When connecting a microphone to the jack, both the left and right channel line inputs will be cut and microphone recording will be performed.
Use the REC LEVEL control for microphone recording level adjustment.
- Microphone sound will distribute on both the left and right channel tracks.
- Disconnect the microphone from the jack when recording from both the left and right channel line inputs.

⑮ Recording level control (REC LEVEL)

FLEX (1/f) SYSTEM

- FLEX System: Frequency Level Expander System
  This system automatically compensates high and low frequency level balance above 1 kHz according to the 1/f curve during playback.
  Generally, envelope line of sound energy distribution of Hi-Fi sounds corresponds statistically with the 1/f curve.
  The 1/f curve indicates that if the frequency doubles, the level decreases by approx. half of the original frequency level.
- During playback, the FLEX system automatically compensates tapes with poor sound quality at high frequency levels of 1 kHz to 20 kHz, based on the appropriate auditory characteristics.
  The FLEX system is designed to improve high frequency reproduction in the 10 kHz renge be up to 12 dB, particularly in tapes with poor sound clarity and sound presence at high frequency levels. If the playback tape sound matches the 1/f curve, the FLEX system defeats compensation adjustment automatically.
- Press the FLEX (1/f) button to turning the FLEX system on.
  If the FLEX (1/f) button is pressed during playing back, the ⊠ indicator will flash in a programmed graphic sequence, then change to a steadily lit condition. The AUTO indicator stays lit.
  If the FLEX (1/f) button is pressed during a mode other than playback, only the ⊠ indicator will flash.
  After approximately 3 to 8 seconds, compensation adjustment is completed and the indicators' programmed graphic sequence changes from flashing to a steadily lit condition. Some music selections may take a little longer than 8 seconds.
- When the FLEX system is engaged, each music selection is automatically adjusted during playback. System operation status is indicated by whether the AUTO indicator is lit.
- Compensation data is memorized after the adjustment is completed. However, memorized data is cleared automatically when:
  the power cord is disconnected.
  the FLEX system is turned off.
  the unit set to recording mode (including AUTO BLE and CD · DECK SYNCHRO recording).
  the tape is ejected.

NOTE:

- *When a tape has been recorded at a high frequency level above the compensation level, FLEX system operation is automatically defeated during playback.*

REPEAT PLAYBACK

When the TIMER switch is set to the PLAY-REPEAT position for playback, the forward side of the tape is played back repeatedly until the stop (■) button is pressed, or until the tape has been played completely sixteen sides. When the tape reaches its end, it is rewound and starts automatically from the beginning.

- If any operation button is pressed, repeat playback is reset and repeat playback of all sixteen sides begins.

AUTO BLE TUNING SYSTEM

With commercially available cassette tapes, sensitivity and frequency characteristics might differ slightly from one another, even though the same sound adjustment is set for them. To utilize tape characteristics to the maximum possible and realize an ideal recording which reproduces the source exactly, optimum recording level (sensitivity) and equalizer values must be set accordingly for each tape. In many conventional tape decks, standard values are fixed for standard tapes, thus nullifying the subtle differences between individual tapes. Perfect tuning by ear through use of fine adjustment controllers for bias and sensitivity is difficult and requires a lot of effort. It is especially difficult with a 2-head deck where the recording sound cannot be monitored.
The AUTO BLE on this unit automatically adjusts bias, level and equalizer by using a microprocessor to set the optimum recording characteristics accordingly for each tape.

DOLBY NR & DOLBY HX PRO

■ Dolby NR Systems

Dolby NR systems are designed to reduce the amount of tape hiss, mainly in the treble components. During recording, the high-pitched pianissimo sounds which are most characteristic of audible noise are boosted, and during playback, only these boosted sections are attenuated, so that tape sound is returned to normal. As a result, the noise is attenuated by an amount equal to the boosting in the treble range. The Dolby B-type NR system reduces noise in the treble range, cutting tape hiss and expanding the dynamic range. The Dolby C-type NR system is even more effective in reducing noise, as it cuts the noise from the mid-range on.

NOTE:
When a tape has been recorded using the Dolby B-type or C-type NR system, make sure that the DOLBY NR switch is set to the same position during playback.

■ Dolby HX PRO Headroom Extension System

The Dolby HX PRO system controls the bias current during recording and always keeps it at an optimal level according to the level of the high frequency components of the music signal. If therefore provides excellent recording quality even when recording signals from digital sources which contain a large amount of high-frequency components. To guarantee optimal recording results, the HX PRO system is activated automatically when recording begins. The Dolby HX PRO system operates regardless of the setting of the Dolby NR System switch. Furthermore, since this system affects the recording quality itself, the clarity and high quality of the sound will be maintained even when the tapes are played back on another tape deck which does not contain the HX PRO Headroom Extension System.

9. SPECIFICATIONS

System ..... 4 track, 2-channel stereo
Heads ..... "Hard Permalloy" recording/playback head × 1
"Ferrite" erasing head × 1
Motor ..... DC servo motor × 1
Wow and Flutter ..... No more than 0.075% (WRMS, JIS)
No more than ±0.18% (DIN)
Fast Winding Time ..... Approx. 90 seconds (C-60 tape)
Frequency Response (at −20 dB recording level)
TYPE IV (Metal) tape ..... 25 to 18,000 Hz
TYPE II (High/CrO_2) Tape ..... 25 to 17,000 Hz
TYPE I (Normal) Tape ..... 25 to 17,000 Hz
Signal-to-Noise Ratio (Dolby NR OFF)
Dolby NR off ..... More than 57 dB
Noise Reduction Effect
Dolby B-type NR ON ..... More than 10 dB (at 5 kHz)
Dolby C-type NR ON ..... More than 19 dB (at 5 kHz)
Harmonic Distortion ..... No more than 1.0%
(at −4 dB: 160 nwb/m)
Input (Sensitivity)
LINE (INPUT) ..... 100 mV (Input impedance 67 kΩ)
MIC ..... 0.5 mV (Multivoltage and Australian models only)
Output (Reference level)
LINE (OUTPUT) ..... 0.5 V (Output impedance 3 kΩ)
Headphone (PHONES) ..... 0.63 mW (Load Impedence 8 Ω)

Miscellaneous

Power requirements
U.K., model ..... AC 230—240 Volts~, 50/60 Hz
European model ..... AC 220—230 Volts ~, 50/60 Hz
Multi-voltage models ..... AC 110V/120V—127V/220V/240V
(switchable), 50/60 Hz
Power consumption ..... 17 W
Dimensions
U.K. and European models ..... 420 (W)×125 (H)×280 (D) mm
Multi-voltage and Australian models
..... 420 (W)×120 (H)×280 (D) mm
Weight (without package)
European and Multivoltage model ..... 3.9 kg
U.K. and Australian models ..... 4.2 kg

Subfunctions

- Dolby B-type and C-type NR Systems
- DOLBY HX PRO system
- Auto tape selector (TYPE I, II, IV)
- Headphones jack
- 4-digit electronic tape/time counter
- Music search up to ±15 selections
- Automatic space recording mute
- AUTO BLE tuning system
- FL level meter 7 + 1 segments (with peak hold)
- SR System remote control available
- CD · DECK SYNCHRO function
- Timer Recording/Playback (Automatic repeat playback ON)
- MIC jack (Multivoltage and Australian models)

Accessories

Operating instructions 1
Connection cord with pin plugs 2
SR Remote control cord 1
CD · DECK SYNCHRO control cord 1

NOTE:
Specifications and design subject to possible modifications without notice, due to improvements.